

# Printers

This chapter presents the requirements and recommendations for printers under the Microsoft Windows family of operating systems.

Version 1.1

Includes changes to References for Printers

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## Overview for Printers

This section presents the key design issues for printers under Microsoft Windows. Printers and other devices attached to parallel ports should be capable of high-speed, bidirectional data transfers. The design criteria for parallel devices follow those for parallel ports described in the “Serial, Parallel, and Wireless Support” chapter.

The PC 97 requirements for printers and parallel ports seek to ensure the following:

- Ensure maximum speed for transfer of parallel data between the system and the peripheral.
- Ensure a true Plug and Play experience for users.

## Basic Printer Features

This section summarizes the basic hardware requirements for printers for PC 97.

### Basic Features for IEEE 1394 Printers

This section defines requirements for printers that use IEEE 1394.

#### **1. Compliance with PC 97 requirements for IEEE 1394**

*Required*

This bus is recommended in PC 97 for support of fast, high-density data transfer. For information about implementing IEEE 1394 for PC 97, see the “IEEE 1394” chapter in Part 3 of this guide.

### Basic Features for USB Printers

This section defines requirements for printers that use USB.

#### **2. Compliance with PC 97 requirements for USB devices**

*Recommended*

This bus is required for PC 97 systems. It is recommended that USB printers conform to the USB Printer Class specification. For information about implementing USB for PC 97, see the “USB” chapter in Part 3 of this guide.

## Basic Features for IEEE 1284 Printers

This section defines requirements for printers that use IEEE 1284.

### 3. Support compatibility mode, nibble mode, and ECP, compliant with IEEE 1284-I

*Required*

Parallel peripherals must implement nibble mode and compatibility mode. Nibble mode provides a means of transferring the identification string from the peripheral to the system. Compatibility mode provides backward compatibility with non-Plug and Play systems that do not support more advanced modes.

A parallel device complies with IEEE 1284 if it meets the required criteria documented in the IEEE 1284 specification, “Standard Signaling Method for a Bi-directional Parallel Peripheral Interface for Personal Computers.” For a parallel device that connects to a PC 97 system, the minimum requirement is IEEE 1284 Level I compliance, which implements the compatibility and nibble modes, as specified in IEEE 1284 and defines the mechanical and electrical specifications of the peripheral.

A 1284-I-compliant peripheral uses the standard 1284-B connector. In all cases, ensure that there is enough space between the connectors and the surrounding enclosure to allow for a mating connector, the connector shell, and the latch assembly.

For more information about the electrical specifications for 1284-I-compliant peripherals, see the IEEE 1284 specification.

For more information about these mode requirements, see the following related requirements defined for parallel ports in the “Serial, Parallel, and Wireless Support” chapter:

- **Error! Not a valid link..**
- **Error! Not a valid link..**
- **Error! Not a valid link..**

### 4. IEEE 1284-II compliance

*Recommended*

Peripheral devices capable of handling the high-speed data rate should support the protocols of the IEEE 1284 ECP mode.

### 5. ECP printer works correctly when ECP mode is turned off

*Required*

This ensures that the user has correct printing support when ECP mode is not used.

**6. Hardware supports error notification***Required*

The following minimum errors must be reported individually by the hardware:

- Out of Paper
- Paper Jam
- Load Other Paper Size

## PC 97 Design for Printers

This section summarizes requirements related to the design initiatives for PC 97 in Part 1 of this guide.

### Plug and Play for Printers

The items in this section are requirements for Plug and Play capabilities. For Plug and Play requirements related to the printer port on the PC, see the “Serial, Parallel, and Wireless Support” chapter in Part 4, or the related bus port requirements, such as IEEE 1394, in Part 3 of this guide.

**7. Support Plug and Play for all supported buses***Required*

Complete Plug and Play support must be implemented for all buses that the device supports. For information about the Plug and Play requirements, see the related bus-class definitions in Part 3 of this guide.

**8. Compliance with requirements for IEEE 1284 peripherals***Required*

These requirements include a Plug and Play device identifier as described in the IEEE 1284 specification. For more information, see the “Serial, Parallel, and Wireless Support” chapter in Part 4 of this guide.

Recommended: Support CompatibleID key in the device identification string.

## Power Management for Print Components

This section summarizes the specific power management requirements for printers.

### **9. Compliance with “Device Class Power Management Reference Specification”**

*Required*

The “Device Class Power Management Reference Specification” for printers provides definitions of the OnNow device power states (D0–D3) for these devices. The specification also covers device functionality expected in each power state and the possible Wakeup event definitions for the class.

### **10. Support Wakeup Events defined in “Device Class Power Management Reference Specification”**

*Optional*

For PC 97, the ability to cause a Wakeup event as defined in the “Device Class Power Management Reference Specification” for printers is an optional feature.

### **11. Support USB or IEEE 1394 power management requirements**

*Required*

Printers that support USB or IEEE 1394 must also support the power management requirements for those buses, as defined in Part 3 of this guide.

## Device Drivers and Installation for Printers

This section summarizes requirements for device drivers for printers. The items in this section are requirements for all variations of PC 97.

### **12. Printer INF and installation meet Windows and Windows NT standards**

*Required*

Each device requires a printer INF for both Windows 95 and Windows NT operating systems. The manufacturer does not need to supply a printer INF if a standard printer INF provided with the operating system can be used.

If the manufacturer provides an INF file, it must be complete and free of errors. This INF file must comply with the printer-specific extensions listed in the Windows 95 and Windows NT DKKs.

If the manufacturer supplies an INF or other files, the requirements for printer INFs and installation include the following:

- All devices and files must pass testing by Microsoft WHQL.
- All configuration settings are stored in registry.
- The correct files specified in the device’s INF must be installed in the correct locations.

- Driver installation and removal use Windows-based methods as defined in the Windows 95 and Windows NT DDKs.
- Files provided by the vendor must not use the same file names as used by files included in Microsoft operating systems, unless specifically agreed with Microsoft.

For complete details about standard installation requirements for device drivers, see “Basic PC 97” in Part 2 of this guide.

### **13. Driver reports device capabilities correctly**

*Required*

For Windows 95, this means that the driver correctly supports the DEVMODE structure as defined in the Windows 95 DDK.

### **14. Device driver supports error notification**

*Required*

At a minimum, the device driver must support reporting to the user the errors reported by the hardware.

### **15. ICC color matching support**

*Required*

The Image Color Matching (ICC) APIs and functionality for Windows 95 are described in the Windows 95 SDK and DDK on MSDN. Windows supports using color profiles that comply with the ICC Profile Format Specification. For information, see the International Color Consortium web site at <http://www.color.org>.

Minimum implementation of ICC color matching requires one or more ICC profiles to be installed. Providing a monitor color calibration utility is recommended for generating, editing, and installing ICC profiles.

Eastman Kodak, the supplier of the default color matching method for ICM in Windows 95, has a wide array of advanced color management technology and products including device profiles that can be used to optimize a system. For contact information, see the “References for Printers” section at the end of this chapter.

### **16. Port monitor software complies with DDK guidelines**

*Required*

If the device includes bi-directional port monitor software that replaces the default Windows port monitor, this software must accurately report errors.

For information about implementing port monitor software, see the Windows 95 and Windows NT DDKs.

**17. Driver supports “point and print” network installation***Required*

This support means that the user is not required to provide disks or files when installing a new printer of the same type as another printer on the network.

**18. Device available immediately after installation***Required*

The user should not have to restart the system to be able to print immediately after installation is complete.

**19. Accurate printable regions***Required*

The printable regions that can be selected in the user interface must be accurately supported in the actual print output.

**20. Driver for Windows NT supports required DDIs***Required*

These are defined in the Windows NT 4.0 DDK. Win32-based printer drivers ensure that print commands from Windows NT-based applications are executed correctly on the specified printer or plotter. Because Win32 APIs are not hardware specific, it is the job of each printer driver to interpret the commands for its specific hardware.

**21. Driver for Windows 95 supports required DDIs***Required*

This requirement includes correct support for all features advertised for the device plus required support for Windows 95 features. For Windows 95, the DDIs that must be supported are listed in the “Printer Driver Overview” section of the Windows 95 DDK. This includes the following support, in addition to other support defined in the DDK:

- TrueType glyph indices
- Big fonts (those that require more than 64K to express)
- Enhanced metafile (EMF) spooling
- Bezier curve output
- Services from the Windows 95 DIB engine

## 22. Device driver based on universal printer driver

*Recommended*

Microsoft provides a Universal Printer Driver (Unidriver), which is capable of carrying out requests (such as printing text, rendering bitmaps, or advancing a page) on most types of printers. To build a driver for a particular printer, a developer builds a minidriver, which accepts requests from GDI and then, in most cases, passes the request to the Unidriver along with information that describes the capabilities, commands, and resident fonts of the particular printer. For more information, see the Windows NT 4.0 and Windows 95 DDK.

## References for Printers

This section lists some of the publications, services, and tools available to help build hardware that works with Windows operating systems.

Windows 95 and Windows NT Device Driver Kits (DDK)

MSDN Professional membership.

International Color Consortium

ICC Profile Format Specification

<http://www.color.org>

Eastman Kodak

Attn. Color Management Group

164 Lexington Road

Billerica, MA 01821 USA

1-800-75COLOR

Device Class Power Management Reference Specification

<http://www.microsoft.com/hwdev/onnow.htm>

### **Version 1.1 References Update:**

*ICC Profile Format Specification, Version 3.4*

International Color Consortium

<http://www.color.org>

*Standard Signaling Method for a Bi-directional Parallel Peripheral Interface for Personal Computers (IEEE 1284 specification)*

ASK\*IEEE

Phone: (800) 949-4333

Fax: (212) 310-4091

Global Engineering Documents

Phone: (800) 854-7179 (US)

(613) 237-4250 (Canada)

(303) 792-2181 (Outside North America)



Fax: (303) 397-2740

<ftp://ftp.symbios.com/pub/standards/io/>

*Universal Serial Bus Device Class Definition for Printing Devices, Version 1.0*

Phone: (503) 264-0590

Fax: (503) 693-7975

<http://www.usb.org>

Windows and Windows NT DDKs and Win32 SDK

MSDN Professional membership

## Checklist for Printers

### **Basic Printer Features**

#### Basic Features for IEEE 1394 Printers

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1. *Compliance with PC 97 requirements for IEEE 1394*  
Required

#### Basic Features for USB Printers

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2. *Compliance with PC 97 requirements for USB devices*  
Recommended

#### Basic Features for IEEE 1284 Printers

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3. *Support compatibility mode, nibble mode, and ECP, compliant with IEEE 1284-I*  
Required

4. *IEEE 1284-II compliance*  
Recommended

5. *ECP printer works correctly when ECP mode is turned off*  
Required

6. *Hardware supports error notification*  
Required

### **PC 97 Design for Printers**

#### Plug and Play for Printers

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7. *Support Plug and Play for all supported buses*  
Required

8. *Compliance with requirements for IEEE 1284 peripherals*  
Required

#### Power Management for Print Components

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9. *Compliance with "Device Class Power Management Reference Specification"*  
Required

10. *Support Wakeup Events defined in "Device Class Power Management Reference Specification"*  
Optional

11. *Support USB or IEEE 1394 power management requirements*  
Required

#### Device Drivers and Installation for Printers

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12. *Printer INF and installation meet Windows and Windows NT standards*  
Required

13. *Driver reports device capabilities correctly*  
Required

14. *Device driver supports error notification*  
Required

15. *ICC color matching support*  
Required

16. *Port monitor software complies with DDK guidelines*  
Required

17. *Driver supports "point and print" network installation*  
Required

- 18. *Device available immediately after installation*  
Required
  - 19. *Accurate printable regions*  
Required
  - 20. *Driver for Windows NT supports required DDIs*  
Required
  - 21. *Driver for Windows 95 supports required DDIs*  
Required
  - 22. *Device driver based on universal printer driver*  
Recommended
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